

Quarterly Estimates of Construction

By Burton H. Klein

Analysis of short-term fluctuations in construction activity and the relation of these fluctuations to changes in general business conditions requires a series which measures changes in the volume of construction for intervals shorter than a year.¹

At the present time the need for such information is greater than usual because of the necessity of studying the effect of priority measures on various branches of the industry, and, more generally, of bringing into clearer perspective the changing composition of construction as the industry is mobilized for war.

In recognition of these needs, the Bureau of Foreign and Domestic Commerce has developed a series of quarterly estimates of construction activity from 1939 to date.²

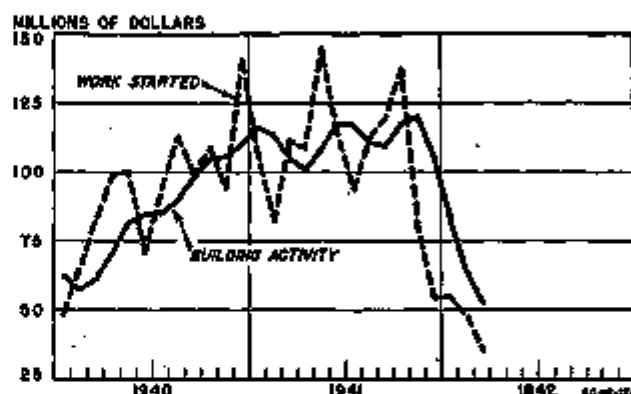
For the present, no attempt is made to adjust the series for seasonal variation. Certain types of construction, such as residential building, farm, and highway construction, display marked seasonal movements. Over the short period covered by the estimates, however, it is difficult to work out satisfactory seasonal patterns. Furthermore, the development of the war economy and the resultant concentration upon particular types of construction has resulted in a definite dampening of seasonal fluctuations. Seasonal elements have slight effect upon the construction of industrial buildings. Military construction, an increasing portion of the total, likewise is little affected by seasonal factors. In view of these considerations, the data are presented in a seasonally unadjusted form.

The estimates measure construction activity; i. e., the value of work done during each quarter. For some purposes, such as tracing the influence of economic factors on private investment, predicting short-run changes in the volume of activity, or, anticipating material and labor requirements, a "value of work begun" series is more useful. In figure 13 the nature of the relationship between work begun and construction activity for private nonresidential building is shown. The series includes private factory, commercial and various types of institutional buildings. Changes in the work-begun series anticipate changes in the activity series by a period of 4 to 6 months.

Important changes in both the trend and composition of construction activity have occurred since 1939. As is shown in figure 14, the various types of private construction have risen markedly from the beginning of

1939 to the closing months of 1941. Total private construction during the last 2 quarters of 1941 exceeded the corresponding periods of 1939 and 1940 by 40 and 18 percent, respectively. Private residential construction increased at an average rate of \$21 million per quarter over the period 1939-41. During the last

Figure 13.—Value of Private Nonresidential New Building Construction excluding Public Utility and Farm Construction



Source: U. S. Department of Commerce.

quarter of 1941, private industrial construction, increasingly directed toward the construction of industrial facilities for armament production, was 230 percent higher than the 1939 quarterly average, and 77 percent higher than the 1940 average.

Beginning in the last quarter of 1940, the rise in public construction, brought about by the rearmament program, began to outstrip the rise in private construction with the public component becoming an increasing share of the total. During the fourth quarter of 1941, for example, private construction was 10 percent higher than in the last 3 months of 1940, whereas the increase in public construction was more than 8 times as great. Public construction rose from two-fifths of the total during the first quarter of 1940 to nearly three-fifths in the last 3 months of 1941. From the first quarter of 1940 to the same period a year later, military and naval construction rose from one-thirtieth to one-quarter of the total. In the first quarter of 1942, private construction, falling in both absolute and relative amounts, was only one-third of the total volume of construction activity.

Derivation of the Estimates.

The data and methods used in making the quarterly estimates are outlined below. The estimates are divided into two main groups—those for which the basic source is contract or permit data, and the remain-

¹ A comprehensive account of the annual estimates of construction activity appears in "Construction Activity in the United States, 1916-37," Domestic Commerce Series No. 29. Approximately comparable figures through 1941 appeared in the *Survey of Current Business*, February 1942.

² Further extension to cover the whole decade of the thirties is in progress.

der which are reported on a direct activity basis either by government or various private agencies.

A. Estimates made from contract or permit data.

1. Residential construction (nonfarm).

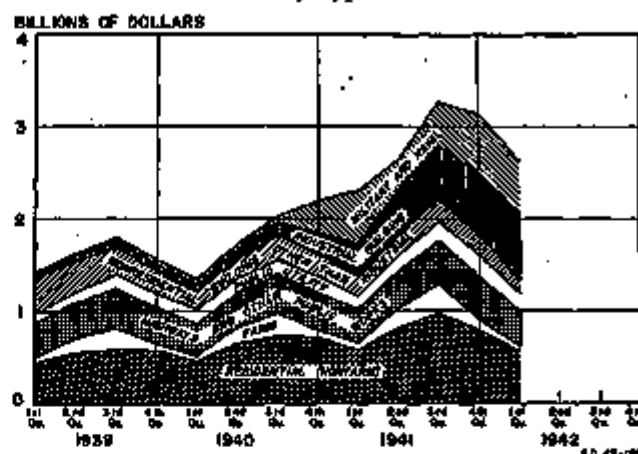
The estimates of residential construction are prepared by the Bureau of Labor Statistics using permit figures as a basic source. Adjustments are made for undervaluation and for inclusion of nonreporting areas.² In arriving at a total value series, allowance is made for the construction of nonhousekeeping units and major additions, alterations, and repairs. The series is then converted to an activity basis by using different time lags for one and two, and multifamily dwellings.

2. Private and Public nonresidential building.

The basic source for making these estimates is contract data collected by the F. W. Dodge Corporation.³ Since Dodge does not collect contract data for the 11 Western States, it is necessary to adjust these figures to attain country-wide coverage. Adjustment factors for each type of construction were obtained by using permit data collected by the Bureau of Labor Statistics and Engineering News-Record data, both of which cover the United States. Permit data assembled by the Federal Reserve Bank of San Francisco for

the seven most important Western States were also consulted.

Figure 14.—Value of Public and Private New Construction by Type



Note.—Data do not include work-relief construction, for source of data in this chart, see accompanying tables and text.

Each type of construction is further adjusted to allow for undercoverage. The adjustment factors were based on comparisons of Dodge statistics with Census data, information collected by government agencies such as the Office of Education, and other types of related data.

After these adjustments for coverage, timing patterns for each type of construction were applied to the value of contract awards in each month in order to estimate the volume of construction activity in sub-

New Construction Activity in the United States, by Function and Ownership

(Millions of dollars)

Item	1939					1940					1941					1942
	Annual total ¹	First quarter	Second quarter	Third quarter	Fourth quarter	Annual total ¹	First quarter	Second quarter	Third quarter	Fourth quarter	Annual total ¹	First quarter	Second quarter	Third quarter	Fourth quarter	First quarter
New construction ²	4,397	1,403	1,622	1,793	1,549	7,276	1,238	1,734	2,090	2,204	11,358	2,302	2,041	2,270	2,142	2,637
Private construction	3,852	1,298	1,475	1,678	1,407	6,521	1,117	1,540	1,840	1,933	10,472	1,833	1,624	1,689	1,546	2,011
Residential (nonfarm) ³	2,045	627	628	658	582	3,223	618	693	661	660	2,675	608	586	516	491	450
Nonresidential building	749	149	171	224	211	982	175	230	286	312	1,308	277	318	327	334	180
Commercial	394	84	78	85	84	534	86	95	90	87	388	85	105	113	85	64
Industrial	227	35	54	86	73	423	68	90	103	140	678	188	158	146	128	94
All other ⁴	325	54	47	71	52	226	41	49	69	60	248	54	57	68	61	41
Farm construction ⁵	630	63	169	228	79	570	67	171	240	90	719	72	215	232	107	85
Residential	334	34	71	104	34	251	25	75	113	38	315	32	66	142	47	28
Service	294	29	88	123	44	319	32	96	127	48	400	40	120	180	60	27
Public utility ⁶	428	104	117	154	153	645	160	183	163	175	775	161	176	203	244	186
Public construction ⁷	2,545	677	647	617	574	2,785	527	577	583	571	6,884	1,250	1,237	1,601	1,760	1,744
Military and naval ⁸	114	17	24	23	46	570	47	52	46	261	2,065	543	318	401	570	600
Nonresidential building	782	283	225	144	114	487	101	92	145	154	1,671	237	406	492	542	682
Industrial	14	4	2	3	4	144	11	9	51	73	1,400	165	334	423	475	608
All other ⁹	748	278	223	141	104	343	90	83	94	80	271	72	64	69	65	64
Highway	384	212	212	241	218	946	197	227	232	290	1,015	286	243	280	274	228
Sewage disposal and water supply	257	60	72	68	66	143	46	35	32	30	115	29	38	29	27	37
Residential	78	5	12	23	35	205	41	53	61	59	470	75	118	158	158	104
All other Federal ¹⁰	326	80	75	51	90	368	88	87	89	91	424	86	67	107	125	103
Miscellaneous public service enterprises ¹¹	91	20	25	28	20	101	20	30	31	20	122	23	33	35	30	22

¹ The totals are revisions of the annual estimates of total construction activity that appeared in the *Survey of Current Business*, February 1942.

² Does not include data for work-relief construction.

³ The 1939-41 figures were prepared by the Bureau of Labor Statistics; the figures for the first quarter of 1942 is a preliminary estimate of the Department of Commerce.

⁴ Includes religious, educational, social and recreational, hospital and institutional, and miscellaneous nonresidential building.

⁵ Includes an indeterminate amount of maintenance.

⁶ Includes railroads, street railways, pipe lines, electric light and power, gas, telephone and telegraph utilities.

⁷ Includes armaments, aeronautical facilities, navy yards and docks, army and navy hospitals, etc.

⁸ Includes "public," commercial, educational, social and recreational, hospital and institutional, and miscellaneous public buildings.

⁹ Includes work done by Bureau of Reclamation, Indian Service, Forest Service, Army Engineers, National Park Service, Tennessee Valley Authority, Soil Conservation Service, and other Federal agencies not elsewhere included.

¹⁰ Includes such municipal enterprises as street railways and other transit systems, gas systems, ports, docks, harbors, airports, tunnels, etc.

Sources: U. S. Department of Commerce; see also text.

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quent months.⁴ In developing these timing patterns, account is taken of both the time that elapses between the inclusion of the data in the Dodge "contract award" series and the beginning of work, and the time required to complete certain types of buildings. The building period varies for each type of construction. For example, a period averaging slightly more than 4 months is used for factory building, while a period of 7 months is used for hospital and institutional buildings. It is not assumed that activity arising from a particular month's contract awards is spread evenly over the whole period; different percentages are used in each of the successive months.

B. Estimates Reported on a Direct Activity Basis.

1. Farm Construction.

Estimates of Farm construction are made by the Bureau of Agricultural Economics. In contrast to the other estimates, these include maintenance because no satisfactory method has been developed to separate new farm construction from maintenance. Since it was impossible to obtain the data on a quarterly basis, "normal" quarterly factors were derived in consultations with the Bureau of Agricultural Economics and applied to the annual estimates.

2. Public Utility Construction.

Estimates of construction work by public utilities are, for the most part, based on reports from organizations such as The Bureau of Railway Economics and the Bell Telephone Company. When it was not possible to secure the data on a less than annual basis, contract data for the specific type of utility were converted to a quarterly activity series and applied as an index to the annual reported figure.

3. Military and Naval Construction.

For the period prior to July 1941, military and naval construction figures were secured from the War and Navy Departments. Subsequent to that date, the figures were obtained from the War Production Board and adjusted to exclude strategic highways which are included in the highway estimates.

4. Public Factory Construction.

Beginning in 1941, monthly estimates of war industrial facilities were secured from the War Production Board. Publicly financed but privately owned

facilities were excluded since these are included in the estimates of private industrial construction.

5. Highway Construction.

The Public Roads Administration prepares annual estimates of total highway construction based on annual reports from State Highway Commissions, and surveys of municipal and county outlays for highways. A quarterly index of highway construction was used to distribute the annual totals by quarters and to extrapolate the 1941 figure.

6. Sewage Disposal and Water Supply.

Estimates for these types of construction are based on data from Financial Statistics of Cities, last appearing May 1938. The annual figure derived from these sources was apportioned and extended quarterly by an index of Sewage Disposal and Water Supply construction, obtained by converting contract data for these types of construction to an activity series.

7. Public Residential Housing.

Data for Public Residential Housing were secured from the public housing agencies and the War Production Board and adjusted to exclude duplication.

8. All Other Federal Construction.

This category includes construction done by the following agencies: Bureau of Reclamation, Indian Service, Forest Service, Army Engineers, National Park Service, Tennessee Valley Authority, Soil Conservation Service, and miscellaneous work of other agencies not elsewhere included.

Most of the annual estimates and some of the quarterly are secured by reports from these agencies. In some of the cases in which it was not possible to secure quarterly data, the Bureau of Labor Statistics' revised monthly figures on man-hours, pay rolls and material orders of government agencies engaging in construction were used to apportion the totals. For some of the smaller agencies where the Bureau of Labor Statistics indexes were not found to be appropriate, and it was not possible to secure quarterly figures from the agency, indexes of construction activity for agencies engaging in similar types of work were used.

9. Miscellaneous Public Service Enterprises.

This heading includes expenditures for street railways, and other transit systems, gas systems, ports, docks, harbors, ferries, airports, and other municipal enterprises. The main source for these data is Financial Statistics of Cities. Various types of indexes similar to those described above were used to apportion and extrapolate the annual totals.

⁴In deriving these time patterns use has been made of the data collected by the Public Works Administration, some of which appears in "The Economic Effects of the Federal Public Works Expenditures, 1933-38," November 1940, National Resources Planning Board; studies made by Mr. Ray E. Foster, formerly of the Federal Reserve Board and other related data.